



## General

### Guideline Title

Screening for blunt cardiac injury: an Eastern Association for the Surgery of Trauma practice management guideline.

### Bibliographic Source(s)

Clancy K, Velopulos C, Bilaniuk JW, Collier B, Crowley W, Kurek S, Lui F, Nayduch D, Sangosanya A, Tucker B, Haut ER, Eastern Association for the Surgery of Trauma. Screening for blunt cardiac injury: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg. 2012 Nov;73(5 Suppl 4):S301-6. [28 references] [PubMed](#)

### Guideline Status

This is the current release of this guideline.

This guideline updates a previous version: Eastern Association for the Surgery of Trauma (EAST), Practice Parameter Workgroup for Screening of Blunt Cardiac Injury. EAST practice management guidelines for trauma. Allentown (PA): Eastern Association for the Surgery of Trauma; 1998 Jan 23. Practice management guidelines for screening of blunt cardiac injury. p. 7-31. [56 references]

## Recommendations

### Major Recommendations

The levels of recommendation (1-3) and classification of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Note: The workgroup attempted to address previously determined recommendations and whether there was additional scientific evidence to support each one, move it to a different level, or eliminate it altogether. The workgroup then reviewed the literature to assess whether new recommendations could be made. Changes from the original guideline are noted accordingly.

#### Level 1

An admission electrocardiogram (ECG) should be performed on all patients in whom blunt cardiac injury (BCI) is suspected (no change).

#### Level 2

1. If the admission ECG reveals a new abnormality (arrhythmia, ST changes, ischemia, heart block, and unexplained ST changes), the patient should be admitted for continuous ECG monitoring. For patients with preexisting abnormalities, comparison should be made to a previous ECG to determine need for monitoring (updated).
2. In patients with a normal ECG result *and* normal troponin I level, BCI is ruled out. The optimal timing of these measurements, however, has yet to be determined. Conversely, patients with normal ECG results but elevated troponin I level should be admitted to a monitored setting

(new).

3. For patients with hemodynamic instability or persistent new arrhythmia, an echocardiogram should be obtained. If an optimal transthoracic echocardiogram cannot be performed, the patient should have a transesophageal echocardiogram (updated).
4. The presence of a sternal fracture alone does not predict the presence of BCI and thus should not prompt monitoring in the setting of normal ECG result and troponin I level (moved from Level 3).
5. Creatinine phosphokinase with isoenzyme analysis should not be performed because it is not useful in predicting which patients have or will have complications related to BCI (modified and moved from Level 3).
6. Nuclear medicine studies add little when compared with echocardiography and should not be routinely performed (no change).

#### Level 3

1. Elderly patients with known cardiac disease, unstable patients, and those with an abnormal admission ECG result can safely undergo surgery provided that they are appropriately monitored. Consideration should be given to placement of a pulmonary artery catheter in such cases (no change).
2. Troponin I should be measured routinely for patients with suspected BCI; if elevated, patients should be admitted to a monitored setting and troponin I should be followed up serially, although the optimal timing is unknown (new).
3. Cardiac computed tomography (CT) or magnetic resonance imaging (MRI) can be used to help differentiate acute myocardial infarction (AMI) from BCI in trauma patients with abnormal ECG result, cardiac enzymes, and/or abnormal echo to determine need for cardiac catheterization and/or anticoagulation (new).

#### Definitions:

##### Classes of Evidence

Class I: Prospective randomized controlled trials - the criterion standard of clinical trials. Some may be poorly designed, have inadequate numbers, or suffer from other methodological inadequacies.

Class II: Clinical studies in which the data were collected prospectively and retrospective analyses that were based on clearly reliable data. Types of studies so classified include observational studies, cohort studies, prevalence studies, and case-control studies.

Class III: Studies based on retrospectively collected data. Evidence used in this class indicates clinical series, database or registry review, large series of case reviews, and expert opinion.

##### Levels of Recommendations

Level 1: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data; however, strong Class II evidence may form the basis for a Level 1 recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low-quality or contradictory Class I data may not be able to support a Level 1 recommendation.

Level 2: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by Class II data or a preponderance of Class III evidence.

Level 3: The recommendation is supported by available data, but adequate scientific evidence is lacking. This recommendation is generally supported by Class III data. This type of recommendation is useful for educational purposes and in guiding future clinical research.

## Clinical Algorithm(s)

None provided

## Scope

## Disease/Condition(s)

Blunt cardiac injury (BCI)

## Guideline Category

Diagnosis

Evaluation

Screening

## Clinical Specialty

Cardiology

Emergency Medicine

Internal Medicine

Nuclear Medicine

Radiology

Surgery

Thoracic Surgery

## Intended Users

Advanced Practice Nurses

Allied Health Personnel

Nurses

Physician Assistants

Physicians

## Guideline Objective(s)

- To present recommendations for screening of blunt cardiac injury (BCI)
- To revise and expand on the Eastern Association for the Surgery of Trauma (EAST) 1998 recommendations

## Target Population

Patients with any significant blunt trauma to the anterior chest

## Interventions and Practices Considered

1. Electrocardiogram (ECG)
2. Continuous ECG monitoring
3. Transthoracic or transesophageal echocardiogram
4. Surgery (with consideration of pulmonary artery catheter placement)
5. Troponin I measurement and serial follow-up
6. Computed tomography (CT)
7. Magnetic resonance imaging (MRI)

## Major Outcomes Considered

Accuracy rates of diagnostic tests and studies

## Methodology

### Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

A computerized search of the National Library of Medicine MEDLINE database was undertaken using the PubMed Entrez interface. English-language citations were queried during the period of March 1997 through December 2011 using the primary search strategy: *[((myocardial injury OR myocardial contusion) AND (traumatic OR trauma)) OR (heart injuries)] AND humans NOT (case reports OR letter OR comment OR news)*.

Review articles, autopsy studies, and investigations of indirect myocardial injury after trauma were excluded. The PubMed Related Articles algorithm was also used to identify additional articles similar to the items retrieved by the primary strategy. Of approximately 599 articles identified by these two techniques, those dealing with either prospective or retrospective studies examining blunt cardiac injury (BCI) were selected, composing of 27 institutional studies evaluating diagnosis and management of adult patients with suspected or proven blunt cardiac trauma. Each article was reviewed by two members of the BCI workgroup.

A separate search strategy was used to identify relevant radiology articles using the search *([blunt] AND [cardiac] AND [injury])*. Because major changes in imaging technology have been widely adopted in the last 5 years, 2005 was chosen as a starting point. This yielded 13 articles, 3 of which examined radiologic diagnostic studies. The bibliographies of these articles were then hand searched to yield recent literature regarding utility of diagnostic imaging.

### Number of Source Documents

35 institutional studies

### Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

### Rating Scheme for the Strength of the Evidence

Class I: Prospective randomized controlled trials - the criterion standard of clinical trials. Some may be poorly designed, have inadequate numbers, or suffer from other methodological inadequacies.

Class II: Clinical studies in which the data were collected prospectively and retrospective analyses that were based on clearly reliable data. Types of studies so classified include observational studies, cohort studies, prevalence studies, and case-control studies.

Class III: Studies based on retrospectively collected data. Evidence used in this class indicates clinical series, database or registry review, large series of case reviews, and expert opinion.

# Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

Each article was reviewed by two members of the blunt cardiac injury (BCI) workgroup. The scientific evidence assessment methods outlined by the Eastern Association for the Surgery of Trauma (EAST) Practice Management Guideline (PMG) committee (see the "Availability of Companion Documents" field) was applied when classifying the articles identified for review. For purposes of practice management guidelines for trauma, the data was classified as described in the "Rating Scheme for the Strength of the Evidence" field.

Data were collated, and a consensus was obtained for the final recommendations of this practice management guideline update. The evidentiary table is available online at <http://links.lww.com/TA/A202> .

## Methods Used to Formulate the Recommendations

Expert Consensus

## Description of Methods Used to Formulate the Recommendations

The Eastern Association for the Surgery of Trauma (EAST) Practice Management Guideline (PMG) committee reviewed research published since the original guideline to formulate new recommendations based on this recent literature. Data for screening of blunt cardiac injury (BCI) were collated, and a consensus was obtained for the recommendations.

The workgroup attempted to address previously determined recommendations and whether there was additional scientific evidence to support each one, move it to a different level, or eliminate it altogether. The workgroup then reviewed the literature to assess whether new recommendations could be made.

This PMG has 10 total recommendations, including two Level 2 updates, two upgrades from Level 3 to Level 2, and three new recommendations.

## Rating Scheme for the Strength of the Recommendations

Level 1: The recommendation is convincingly justifiable based on the available scientific information alone. This recommendation is usually based on Class I data; however, strong Class II evidence may form the basis for a Level 1 recommendation, especially if the issue does not lend itself to testing in a randomized format. Conversely, low-quality or contradictory Class I data may not be able to support a Level 1 recommendation.

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## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

Not stated

## Description of Method of Guideline Validation

Not applicable

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Accurate screening and diagnosis of blunt cardiac injury (BCI)

### Potential Harms

Not stated

## Qualifying Statements

### Qualifying Statements

- The Eastern Association for the Surgery of Trauma (EAST) is a multi-disciplinary professional society committed to improving the care of injured patients. The Ad hoc Committee for Practice Management Guideline Development of EAST develops and disseminates evidence-based information to increase the scientific knowledge needed to enhance patient and clinical decision-making, improve health care quality, and promote efficiency in the organization of public and private systems of health care delivery. Unless specifically stated otherwise, the opinions expressed and statements made in this publication reflect the authors' personal observations and do not imply endorsement by nor official policy of EAST.
- "Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."<sup>\*</sup> These guidelines are not fixed protocols that must be followed, but are intended for health care professionals and providers to consider. While they identify and describe generally recommended courses of intervention, they are not presented as a substitute for the advice of a physician or other knowledgeable health care professional or provider. Individual patients may require different treatments from those specified in a given guideline. Guidelines are not entirely inclusive or exclusive of all methods of reasonable care that can obtain/produce the same results. While guidelines can be written that take into account variations in clinical settings, resources, or common patient characteristics, they cannot address the unique needs of each patient nor the combination of resources available to a particular community or health care professional or provider. Deviations from clinical practice guidelines may be justified by individual circumstances. Thus, guidelines must be applied based on individual patient needs using professional judgment.

<sup>\*</sup>Institute of Medicine. Clinical practice guidelines: directions for a new program. MJ Field and KN Lohr (eds) Washington, DC: National Academy Press. 1990: pg 39.

## Implementation of the Guideline

### Description of Implementation Strategy

An implementation strategy was not provided.

# Institute of Medicine (IOM) National Healthcare Quality Report Categories

## IOM Care Need

Getting Better

## IOM Domain

Effectiveness

## Identifying Information and Availability

### Bibliographic Source(s)

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### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

1998 Jan (revised 2012 Nov)

### Guideline Developer(s)

Eastern Association for the Surgery of Trauma - Professional Association

### Source(s) of Funding

Eastern Association for the Surgery of Trauma (EAST)

### Guideline Committee

EAST Blunt Cardiac Injury (BCI) Practice Management Guideline (PMG) Workgroup

### Composition of Group That Authored the Guideline

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### Financial Disclosures/Conflicts of Interest

E.R.H. is the PI of a Mentored Clinical Scientist Development Award K08 1K08HS017952-01 from the AHRQ entitled "Does Screening Variability Make DVT an Unreliable Quality Measure of Trauma Care?" E.R.H. receives royalties from Lippincott, Williams, Wilkins for a book he coauthored, *Avoiding Common ICU Errors*. E.R.H. has given expert witness testimony in various medical malpractice cases. The authors declare no conflicts of interest.

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## Guideline Availability

Electronic copies: Available from the [Eastern Association for the Surgery of Trauma \(EAST\) Web site](#) .

Print copies: Available from the EAST Guidelines, c/o Keith Clancy, MD, York Hospital Trauma Program, 1001 South George St, York, PA 17405; email: [kdclancy@yahoo.com](mailto:kdclancy@yahoo.com).

## Availability of Companion Documents

The following is available:

- Utilizing evidence based outcome measures to develop practice management guidelines: a primer. 18 p. 2000. Available in Portable Document Format (PDF) from the [EAST Web site](#) .

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI on April 5, 1999. The information was verified by the guideline developer on June 17, 1999. This NGC summary was updated by ECRI Institute on May 16, 2013.

## Copyright Statement

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